Coimisiún na Scrúduithe Stáit
State Examinations Commission

LEAVING CERTIFICATE EXAMINATION, 2008

AGRICULTURAL SCIENCE - HIGHER LEVEL

FRIDAY, JUNE 20 – AFTERNOON 2.00 – 4.30

SIX QUESTIONS TO BE ANSWERED

SIX QUESTIONS TO BE ANSWERED

1. Answer **any six** of the following:

(a) Write notes on glycogen in the body of a mammal under the following headings:
(i) its site of production, (ii) its function.

(b) In the case of each of the following, name the part of the plant that is modified and give an example of a plant with this modification;
(i) bulb, (ii) tuber.

(c) Explain why the growing of seed potatoes is situated predominantly in county Donegal.

(d) State **one** characteristic which would distinguish members of the family Compositae from members of the family Cruciferae and name a plant from <u>each</u> family.

(e) Draw a labelled diagram to show the main features of a podzol soil.

(f) (i) Why are mineral and vitamin supplements used in the diet of farm animals?
(ii) How are these supplements supplied to farm animals?

(g) (i) Name the larval stage of each of the following; click beetle, crane fly.
(ii) Describe the damage done by each of these larvae.

(h) Give the approximate value of each of the following for pigs;
(i) weight at birth (kilograms),
(ii) age at puberty (months),
(iii) length of oestrus cycle (days),
(iv) length of gestation period (days),
(v) recommended temperature for farrowing unit (^{o}C).

(i) Give reasons why calcium ammonium nitrate gives a more rapid crop response than urea.

(j) State the benefits of using hybrid ryegrasses over the use of Italian ryegrass on its own.

(60 marks)

2. (a) Explain how the weathering of rocks contributes to soil formation.

(b) (i) Explain the following terms as used in the context of plant growth in soil;
1. field capacity, 2. permanent wilting point, 3. available water.

(ii) The following table shows the water content of three soil samples.
1. What is the percentage of available water in sample A?
2. Which sample would be the most suitable for a crop suffering a drought during the growing season?
3. Which sample would be the most suitable for a crop growing during a wet spring?

Soil sample	% Water at Field Capacity	% Water at Wilting Point
A	**6**	**2**
B	**24**	**12**
C	**30**	**22**

(c) Describe an experiment to compare the capillarity of two contrasting soils.

(48 marks)

Option One

3. (a) (i) List **three** advantages of crop rotation.
(ii) Name **two** crops that can be grown as a suitable root break in a cereal rotation.
(iii) State any **one** use for one of the crops you have mentioned.

(b) List **four** factors that are considered by the Department of Agriculture, Fisheries and Food when recommending varieties of cereals to be grown by farmers.

(c) Identify the type of organism which causes each of the following diseases and explain how each disease could be controlled or prevented;
(i) club root in turnips,
(ii) leaf roll in potatoes,
(iii) loose smut in barley,
(iv) common scab in potatoes.

(48 marks)

OR

Option Two

3. (a) (i) Give one benefit of reseeding grassland.
(ii) Explain the term tillering.
(iii) Mention **two** ways by which the farmer can encourage the tillering process.
(iv) Give **two** reasons for the process of "topping" grassland during the grazing season.

(b) (i) Explain the "leader- follower" grazing system and give **two** reasons why it is used by farmers.
(ii) Give **two** reasons for including clover in a seed-mixture for pasture.

(c) Outline how a farmer can provide the optimal conditions for bacteria to produce high quality silage.

(48 marks)

4. Describe a laboratory <u>or</u> field method to determine any **two** of the following:

(a) The percentage of sugar in a sample of grass.

(b) The influence of any **one** named environmental factor on the growth rate of a crop plant.

(c) The butterfat content of milk.

(d) The activity of the liver enzyme catalase. **(48 marks)**

5. (a) Describe how a farmer can ensure the production of high quality milk under the following headings; (i) hygiene, (ii) composition.

(b) For a spring-calving dairy herd, describe the feeding practices for a cow during the following periods;
(i) early lactation,
(ii) mid-lactation,
(iii) late lactation.

(c) Two criteria used to measure the breeding management of a suckler herd are;
(i) reproductive efficiency, (ii) calving interval.
Explain the above terms and outline how they can be optimised in a spring-calving suckler herd.

(48 marks)

[OVER

6. (a) Account for the different nutrient compositions of a dairy ration and a beef ration.

(b) Describe the feeding programme for a calf from birth to weaning in a spring-calving dairy herd.

(c) List **four** advantages of in-wintering of ewes.

(d) Explain the technique known as flushing in sheep production and give **two** of its advantages.
(48 marks)

7. (a) Explain **four** of the following terms, as used in genetics;
mutation, sex linkage, diploid, multiple alleles, back-crossing.

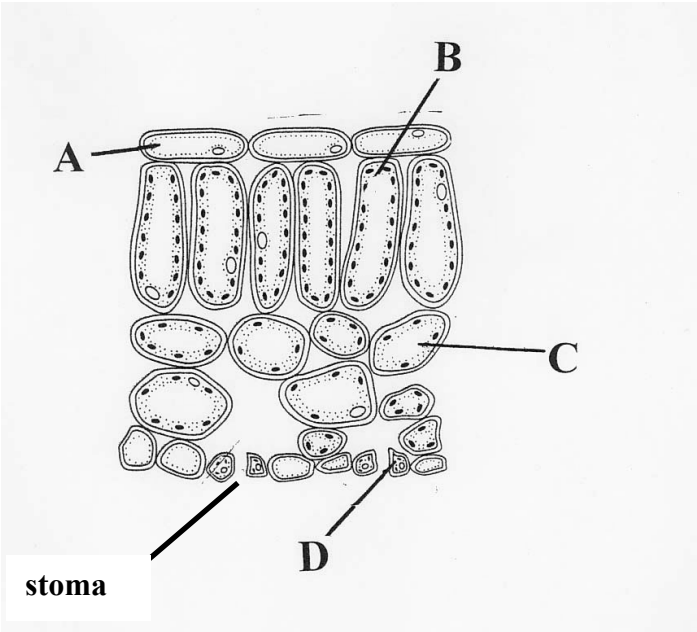
(b) The gender of offspring is determined by the male parent in mammals.
Illustrate this statement in terms of chromosomes.

(c) A broad-leaved red-flowered snapdragon was crossed with a narrow-leaved white flowered snapdragon and all the offspring were broad-leaved with pink flowers.
(i) Suggest why all the offspring were broad-leaved.
(ii) Suggest why all the offspring had pink flowers.
(iii) List the phenotypes that may result from a cross between two plants heterozygous for both traits.
(48 marks)

8. Answer **any two** of the following (a), (b), (c).

(a) A farmer has recently purchased a farm and intends to grow tillage crops on it.
(i) Outline **four** soil characteristics which would determine the suitability of the soil for tillage.
(ii) With reference to **one** of the soil characteristics you have mentioned in (i), describe;
1. how it might be measured,
2. how it might influence the growth of a named tillage crop.

(b) The diagram shows a section through part of a leaf.
(i) Name the cells labelled A, B, C, D.
(ii) Give **two** features of the leaf that are related to its role in photosynthesis.
(iii) Name **two** gases that may leave the leaf through the stoma.
(iv) Write a balanced chemical equation for the process of photosynthesis.



(c) Write a short note on **each** of the following terms:

(i) Monocotyledons and dicotyledons.
(ii) Osmosis and diffusion.
(iii) Aerobic respiration and anaerobic respiration.
(iv) Mitosis and meiosis.

(48 marks)

9. Give a scientific explanation for **four** of the following:

(a) The improvement of a soil by the addition of lime.

(b) The appearance of yellow leaves in crop plants.

(c) The pruning of a field hedge.

(d) The greening of potatoes.

(e) The production of gases in a slurry tank.

(48 marks)

Blank Page